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AMES RESEARCH CENTER

National Aeronautics and Space Administration

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11- by 11-Foot Transonic Wind Tunnel 11' TWT

Primary Use:

The facility is used primarily for force, moment, and pressure tests of aircraft configurations or specific aircraft components. Some aeroacoustic and nonsteady aerodynamic tests are conducted. This tunnel is part of the Unitary Plan Wind Tunnel complex consisting of three legs and test sections. Only one tunnel can be operated at a time.

Capability:

- Mach Number: 0.4-1.5
- Reynolds Number per foot: 1.26-9.4x106
- Stagnation Pressure, PSIA: 7.35-31.9
- Temperature Range: 530-585o R
- Closed circuit, single return, variable density, continuous flow wind tunnel.
- Interchangeability of models between Unitary test sections allows testing across wide range of conditions.
- Internal strain-gage balances are used for measuring forces and moments.
- Support strut has simultaneous variable pitch and yaw capability (+15o).
- Floor support and balance is available for semispan testing.
- Capability for measuring multiple fluctuating pressures.
- Temperature-controlled auxiliary air (3000 psi) with flow capability to 50 lb/sec (at 1500 psi) each of two separately controllable systems.
- Data system
  - Analog data will be acquired using Programmable Gain/Amplifier/Filter Units (PGAFUs) in conjunction with solid state multiplexers feeding multiple 16-bit digitizers.
  - Up to 240 5-wire analog channels will be available for each model support.
  - 96 amplifier channels are routinely available and can be expanded up to the available institutional wiring limitations.
  - 16 channels of 16-bit digital input data can be inserted into the digitized data stream.

    - Up to 2048 pressures will be acquired using Electronically Scanned Pressure modules (ESPs).
    - Significant amounts of facility dedicated, real-time processing and display will be available using a combination of six PC class processors running real-time operating systems coordinated by a midrange UNIX-based workstation.
    - Main computations will be performed in near-time also using the dedicated midrange workstation processor.
    - Point by point plotting will be available.
- User interaction will be X-terminal based.

Status:

- **Originally Built** - 1956
- **Major Mods** - None
- **Current S**tatus - Undergoing major modernization including automatic controls, new data system, increased productivity, and improved flow quality
- **Future Status** - Operational: January, 1998

Utilization:

- **Who/How Much** - Industry and Cooperative programs - 35-60%, Other government agencies - 20-40%, NASA research - 10-30%
- **User Fees** - About $3500-4000 per occupancy hour plus power cost. Updated annually.
- **Legislated Restrictions** - Available primarily to industry and DoD and NASA research.

Capital Value:

- Replacement cost for Unitary Plan Wind Tunnel Complex - $360 Million.

For further information, contact

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